

FCPF Carbon Fund Methodological Framework Discussion Paper #5: Displacement (Leakage)

FOR INPUT INTO AND DISCUSSION BY CARBON FUND WORKING GROUP

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This paper is a work product of independent consultants¹, managed and revised by the FCPF Facility Management Team and World Bank staff, and does not reflect the opinion of the World Bank.

About this document: The FMT commissioned the development of this series of about a dozen topic-specific Discussion Papers (also known as “Issue Papers”) to serve as a common starting point for discussion on the Methodological Framework. The Papers were circulated January-April 2013 to Carbon Fund Participants and to over 100 experts who participated in REDD+ Design Forums which channeled input into the Methodological Framework. For each topic, the corresponding Issue Paper first presents background research and major approaches, and then suggests initial thinking on how to translate that topic into the context of the Methodological Framework of the Carbon Fund.

Because each paper presents a wide range of options, developed at the very beginning of the MF development process, the original drafts do not capture the discussions during Summer 2013 or reflect the final drafts of the MF. For this reason, the FMT has added an introductory chapter to each issue paper during August 2013 entitled “FMT Update.” This aims to identify further approaches and considerations that emerged since the original paper, though it is not a summary of formal deliberations. Section II of each paper denotes the original Issue Paper. These Issue Papers reflect important context and options for the Carbon Fund of the FCPF and also contain useful information and considerations for policymakers and others designing REDD+ frameworks.

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I. FMT Update

1. Other topics considered in discussions on the Methodological Framework

Requiring the estimation of leakage only, rather than a monitoring method

As this paper makes clear, there are many ways to estimate leakage, usually through selection of a method to monitor and measure leakage. Each method of monitoring leakage has advantages and disadvantages, and also can depend on a variety of factors including program design, stakeholders involved, site selection of REDD+ interventions, etc.

A major point of discussion has been the level of prescriptiveness by the MF in terms of carbon accounting. For the ER Programs, the number itself (of estimated leakage) is what matters for the overall total of emissions reduced by the Carbon Fund portfolio. Another option thus proposed by the current draft of the MF is for ER Programs to simply estimate leakage—without a prescribed or required monitoring or measurement approach.

Separating the estimation of leakage from overall ER accounting

Similarly, the current draft of the MF asks the ER Program to provide an estimate of leakage, but the MF does not specify how that estimate will be used. The calculation of overall emissions reductions (Section 3.7, Indicator 22) achieved by an ER Program and the extent to which that calculation subtracts leakage or not, would be a separate section in the MF. This section would contain a formula that encompasses the larger set of measurement issues that contribute to the calculation of ERs, including an option to subtract leakage.

II. Original Issue Paper (January 2013)

1. Key Questions

Should potential sources of leakage (e.g., reduced harvest, or reforestation croplands that leads to lands being harvested or cleared outside the Program area) be assessed using the same standardized approaches and sources for all ER Programs? Or could an approach for leakage assessment be proposed by each Program?

- Does another climate initiative use an approach appropriate for the CF circumstances?
- What key sources should be assessed, using what methods or tool?

To what geographic extent should leakage be assessed? E.g., within the region surrounding the Program area only? Or for the whole country? Should the potential for international leakage be just discussed, or are there circumstances where it should be estimated? (E.g., where Program activities may significantly impact regional agricultural commodity or timber product markets)?

Are there approaches available where Program measures could be put in place to address leakage that are robust enough to avoid a more expensive monitor-and-report approach?

- E.g., by identifying best practices for addressing potential leakage?
- Could the FCPF or others develop something like default look-up tables generated by say global or national-scale economic or other modeling, that provide an agreed percentage of leakage a Program would use for a given set of land use drivers and location?

2. Introduction

The Forest Carbon Partnership Facility's (FCPF) Carbon Fund will enable results-based payments for emission reductions or removals (ERRs) generated by participant countries' emission reduction programs (ERPs). There are a number of different approaches to estimating ERRs from Reducing Emissions from Deforestation and Forest Degradation (REDD+) activities in both the regulated and voluntary markets. The FCPF itself needs to determine the methods it will use to quantify ERRs that are purchased by the FCPF Fund.

Leakage refers to the displacement of deforestation and forest degradation from the areas where REDD+ activities take place to areas outside of the REDD+ implementation areas. Accounting for leakage is a critical element of the quantification of ERRs.

3. Background Helpful to Set the Stage for this Discussion

Traditional Leakage Typology:

Traditionally, leakage has been divided into primary leakage, entailing activity-shifting and outsourcing, and secondary leakage, entailing market leakage and super-acceptance of alternative livelihoods. The distinction is relevant, since approaches that account for the two sources of leakage may be different.

- *Primary Leakage*

Activity-shifting leakage is leakage that directly results from REDD+ activities. When an ERP limits the supply of goods or services from a given area (e.g., timber, rangeland, etc.), emitting activities such as harvesting or conversion may be shifted to another area outside the project boundary. This is because ERP activities may not necessarily alter demand for forest resources (products or land use), and constraints in the supply of forest resources can drive sourcing elsewhere. This shifting of activities may result in displacement of emissions, rather than an overall reduction.²

The tracking of activity-shifting leakage depends in part on the nature of resource consumption. If small local agents reduce biomass via fuelwood collection or small-scale agriculture, activities may be shifted to adjacent areas, which may be easily detected. However, larger logging or agricultural enterprises may shift operations internationally, rendering the quantification of primary leakage more difficult.³

Outsourcing is the purchase of goods or services from outside the area where REDD+ activities take place. Outsourcing may cause leakage even if local deforestation agents do not displace their own conversion activities. These agents may cause emissions, for example, by driving deforestation through the purchase of sawlogs from another jurisdiction.

- *Secondary leakage*

Secondary leakage is the indirect result of implementing REDD+ activities. Specifically, *market leakage* is a form of secondary leakage where REDD+ activities result in increased emissions elsewhere due to changes in supply of forest-related products. In REDD+, market leakage is caused by constraints in forest resources that force a shift in market equilibrium, resulting in extraction or land use change outside project boundaries. Unlike activity-shifting, market leakage is indirect and involves 3rd parties unrelated to the original project. An example would be a REDD+ project that limits supply of an exotic hardwood, raising its market value. In response, new players may enter the market to capitalize on higher prices, causing emissions further afield through market leakage.

² 1. Aukland L, Costa PM, Brown S. 2003. A conceptual framework and its application for addressing leakage: the case of avoided deforestation. *Climate Policy* 3(2):123–36.

³ Henders S, Ostwald M. 2012. Forest Carbon Leakage Quantification Methods and Their Suitability for Assessing Leakage in REDD. *Forests* 3(1):33–58.

Because market leakage is caused by changes in market commodities, subsistence activities and forest resources that are used locally usually do not cause market leakage. For example, since fuelwood has only limited market potential, limiting the available fuelwood often does not lead to market leakage beyond the immediate boundaries of the forest area. In contrast, charcoal is often produced in rural areas and sold to urban centers. Limiting charcoal production could lead to market leakage far beyond the boundaries of where the REDD+ activities take place.

Super-acceptance of alternative livelihoods

Livelihoods options resulting from REDD+ activities being adopted beyond the original deforestation agents are referred to as *super-acceptance of alternative livelihoods*. If the alternative livelihoods generate more emissions than the actors' original activities, then the leakage is considered 'negative'. Conversely, if the adopted livelihoods generate lower emissions, then the leakage is considered 'positive'. As it is not accounted for in the context of the United Nations Framework Convention on Climate Change (UNFCCC) and often considered negligible, few methodologies attempt to quantify or adjust for super-acceptance of alternative livelihoods.

Type and Scale of Potential Leakage:

In addition to the traditional leakage typology it is useful to evaluate leakage in terms of geographic scale and extent. Some approaches to account for leakage will be more appropriate at small scales and across short distances while others are better suited at a larger scale. In general, it is useful to distinguish between three geographic scales when assessing leakage⁴.

- **Leakage outside of the national boundary (international leakage).** Leakage that occurs in other countries is the most challenging to account for and quantify as little or no monitoring may occur in foreign countries. Additionally, determining causation and attributing responsibility or liability for the leakage can be very difficult. It must be noted that, following the precedent established by the UNFCCC, international leakage is usually not monitored, estimated or accounted for.
- **Leakage within national boundaries outside of an ERP.** Agents of deforestation whose mobility is not restricted by distance and/or that are impacted by market forces may cause leakage at locations that are far away from the locations where REDD+ activities take place and that are outside the ERP, but within the country. Attributing changes in distant forest stocks to leakage from a particular ERP is also challenging. This type of leakage is typically limited to commercial agents (forestry or agricultural) and migrants. However, if REDD+ activities take place close to the boundary of the ERP, some activity-shifting leakage may occur right across the ERP border and could lend itself to measurement.

⁴ Note that, even though implementation at the project level seems unlikely to be credited under the UNFCCC, it is assumed that local REDD+ activities will be implemented within an ERP. Leakage monitoring and accounting might still be an issue to be addressed by national governments, for instance, when determining benefit sharing among domestic programs and activities.

- **Leakage within ERP boundaries.** Leakage within an ERP can still occur, either because agents simply move from one part of an ERP to another or because activities shift to the area right outside of the area where REDD+ activities take place within the ERP. Additionally, a reduction in deforestation in one location could be replaced by increased degradation close to that location. Even though the ERP boundary is the accounting boundary for monitoring changes in carbon stocks (and therefore any carbon stock change within the ERP is accounted for, including intra-ERP leakage), there are two important reasons to still consider leakage within an ERP boundary. First, the performance of discrete REDD+ activities, regardless of who implements the activities, must take into account any leakage attributable to these activities. Otherwise, there is no true performance-based incentive to minimize leakage if there is no accounting across multiple actors implementing the REDD+ activities. This is especially important if activities within the ERP cover multiple tenure schemes and/or are implemented across a large number of communities where benefits are to be distributed based on local performance-based results. Attributing intra-ERP leakage becomes even more imperative, when private carbon tenure can be established for one group of REDD+ actors but the surrounding areas are subject to a government managed benefit sharing arrangement. Secondly, many ERP accounting systems will be limited in their accounting accuracy due to cost constraints and may not be able quantify all emissions and removals within the ERP boundary. But, if one can identify an area where the risk for intra-ERP leakage is greatest, one can focus monitoring efforts in that area. For example, degradation monitoring could occur preferentially in leakage belts around REDD+ activities, while deforestation monitoring occurs across the ERP. Degradation can typically be monitored via a combination of remote sensing and surveys; focus group discussions and can be used to attribute specific REDD+ activities to monitored losses in forest biomass.

Any performance-based REDD+ program must set clear rules on how leakage at each of these scales should be accounted for and how attribution of emissions as a result of leakage from one REDD+ actor to another will occur. Due to local circumstances, some flexibility is needed to set up a leakage accounting system that targets all geographic scales relevant for a specific ERP. An analysis of the drivers and agents of deforestation and forest degradation aids in determining the optimal approach to account for leakage for a specific ERP. Additionally, an assessment of the land tenure and carbon tenure types within an ERP is necessary, using recognized standards for rights holders' protections to ensure that the leakage accounting does not inadvertently allow for a "transfer of wealth" between participants in the ERP. At a minimum, the leakage risk from migrants, marketable forest resources, land, agricultural and timber concessions and subsistence farming must be assessed.

4. UNFCCC and Other Relevant Guidance Available To Date

Decision 1/CP.16, adopted by the Conference of the Parties to the UNFCCC at its sixteenth session, suggests that leakage from REDD+ activities should be monitored at the national level.

In order to prevent leakage, Accounting Element 5 (“Address Displacement”) of the elements for development of the FCPF’s key methodological framework states that “measures to minimize and/or mitigate the risk of displacement of domestic emissions should be incorporated into ERR Program design and the estimation and monitoring of ERRs”. To account for any leakage that occurs after implementation of leakage mitigation measures, one or more of the leakage accounting approaches described below could be applied.

There are a number of approaches to prevent and account for leakage from REDD+ activities that have been proposed – and, in some cases, tested – in the regulated and voluntary carbon markets that may be useful to consider when designing the leakage framework for results-based actions supported by the FCPF (see annex for detailed description). Most climate initiative allow the use of multiple approaches to account for leakage.

5. Options for the Carbon Fund Guidance to Address This Topic, including Advantages and Disadvantages

Minimizing Leakage

First and foremost, a REDD+ program must be set up in such a way that leakage is minimized. To the extent possible, rules that prevent leakage from happening must be created. But since it is very likely that there will still be leakage, a monitoring system is necessary to account for the emissions from leakage that cannot be avoided. Two broad types of leakage prevention activities are identified: direct leakage prevention activities and indirect leakage prevention activities addresses through the promotion of alternative livelihoods.

Simply protecting a forest without consideration of how forest resources were used previously often leads to leakage. Leakage can be minimized directly by implementing activities that reduce the greenhouse gas (GHG) intensity of forest resource extraction or land-use, or increase the efficiency of forest resource use. Typical activities in this category include agricultural intensification, the use of water filters and efficient cookstoves to reduce the need for fuelwood, and the introduction of bio-briquettes made of agricultural waste that can replace charcoal. Leakages from drivers of deforestation that are very local are most appropriately reduced by direct leakage prevention activities such as these. Note that any increase in emissions from leakage preventing activities must be included in the carbon

accounting. For example, if agricultural intensification requires the use of chemical fertilizer, increases in nitrous oxide emissions must be considered. Likewise, higher-yielding rice varieties may increase methane emissions that must be accounted for.

In addition to direct leakage prevention activities, offering alternative livelihoods for agents of deforestation that are less dependent on unsustainable forest resource use can be particularly powerful in reducing deforestation. Typical examples include incentivizing livelihoods that are based on the sustainable extraction and on-sale of non-timber forest products such as honey, rattan, or medicinal plants. Employment through eco-tourism, or through forest regeneration activities are other ways to offer livelihoods that are not dependent on the destruction of forest resources. Providing employment for local communities in forest regeneration activities is particularly advantageous as it targets the “+” in REDD+ in combination with avoided deforestation and forest degradation.

Accounting Boundaries and Leakage

When a monitoring system is limited in scope (as is expected to be the case in practice), the danger exists that leakage outside the scope of the monitoring system may go unnoticed. Expanding the scope of the monitoring system to include all potential emissions may be beyond the capacity and budget of an ERP. However potential to cause cross-scope leakage can be usually be assessed. .

▪ **Leakage from Avoiding Deforestation causing Degradation**

Because of cost and timing issues, accounting procedures may focus primarily on quantifying the emission reductions from the avoidance of forests being converted to non-forests, at least in the first phases of the implementation of an ERP. However, the danger exists that leakage from forests being converted to lower-stocked forests will go unnoticed. If this danger is real, extra provisions will be required to ensure that some level of forest degradation monitoring is included in the accounting framework, even if no ERRs from avoiding forest degradation are allowed to be generated. In addition, some level of enforcing forest laws that prevent forest degradation may be effective in minimizing leakage by avoiding deforestation causing degradation.

▪ **Leakage across Carbon Pools**

If not all carbon pools are included in the accounting framework it is possible that some leakage will go unaccounted. For example, conserving aboveground tree biomass may lead to an increase in the harvesting and destruction of the forest understory, consisting of woody shrubs, saplings and seedlings. In case the Measurement, Reporting and Verification (MRV) system only accounts for tree biomass and not for trees or shrubs, this loss in biomass will go unnoticed, and, hence, unaccounted for. This issue is fairly minor under most circumstances.

Summary of Options to Account for Leakage

- **Leakage belts.** In cases where the drivers of deforestation are localized (e.g., subsistence agriculture or fuelwood collection), leakage may be identified and quantified through a leakage belt. A leakage belt is an area surrounding or close to the border of a REDD+ implementation

area and where a risk for leakage exists that is vulnerable to the displacement of drivers of deforestation or forest degradation. The exact size and location of the leakage belt is determined, among other factors, by the interests and mobility of the relevant agents of deforestation and by the suitability of the area to leaked activities. The extent of leakage is quantified as the emissions increase or carbon stocks decrease within the leakage belt with respect to emissions under the reference level. Leakage belts are required by the Verified Carbon Standard for project activities avoiding unplanned deforestation and degradation⁵, and have been operationalized by a number of approved Verified Carbon Standard (VCS) methodologies⁶. This approach is also recommended for use at the jurisdictional level by the VCS Jurisdictional and Nested REDD+ (JNR)⁷. Similarly, the American Carbon Registry (ACR) requires the use of leakage belts.

- **Tracking planned deforestation agents' activities.** Where ERPs focus on reducing planned deforestation (i.e., legally sanctioned forest converted to large-scale plantations through a system of concessions), leakage may be detected and quantified by analyzing the historical behavior and class of the deforestation agent and tracking the behavior and rate of conversion after ERP implementation through surveys and statistics. The amount of leakage would be equal to the excess emissions with respect to the historical behavior. This approach is required by the VCS and the ACR and has included various approved methodologies⁸. The Australian Carbon Farming Initiative (CFI) uses this approach as well.
- **Leakage deductions.** A leakage deduction is a discount that is made to the number of emission reductions or removals achieved within an ERP's boundaries to account for displacement of emissions outside such boundary. The amount deducted should be based on an analysis of the risk and amount of leakage that an ERP may generate. Methods could be developed to this end based on, for example, the ERP's characteristics and context. The analysis could also take into account the existence of leakage prevention measures and leakage sharing agreements (see below). This approach of applying a factor that is determined ex-ante based on leakage risk has been adopted by the VCS to account for market leakage (see the VCS' Market Leakage Discount Factor⁹). It is also suggested, but not required, in the VCS JNR, which provides for a leakage deduction tool for estimating leakage potential outside the jurisdiction¹⁰. The Climate Action Reserve (CAR) and methodologies under the ACR use leakage deductions as well. Leakage deductions could be a hybrid of approaches where ex-ante factors are set and applied to monitored data reported at the ERP level to get the ex-post deduction.

⁵ See the VCS AFOLU Requirements (Version 3.3) section 4.6.15.

⁶ For instance, approved VCS methodology VM0015 "Methodology for Avoided Unplanned Deforestation, v1.1".

⁷ Section 3.12.7 of the VCS JNR Requirements (Version 3.0).

⁸ See, for example, approved VCS methodology module VMD0009 "Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP), v1.1".

⁹ See the VCS AFOLU Requirements (Version 3.3), section 4.6.14.

¹⁰ See VCS JNR Requirements (Version 3), section 3.12.7.

- **Leakage sharing agreements.** Where leakage from one ERP may affect another ERP (within the same country), ERP managers may determine and implement a leakage sharing agreement, establishing, for instance, that each of them is fully responsible for emissions within their own boundaries (or leakage belts), even if some of them may be the result of leakage from the other ERP's activities. Alternatively, arrangements could include payments (compensations) or credit sharing based on the leakage risk of an ERP. Additionally, agreements could include provisions for shared Measurement, Reporting, and Verification (MRV) procedures, costs and data. Leakage sharing agreements, therefore, may not involve direct monitoring or accounting for leakage from an ERP but can allocate costs, transfer of emissions, information, and/or liability between parties that are affected by each other's REDD+ activities. It may be relevant for FCPF purposes if there are other REDD+ activities occurring within a country that hosts an ERP that are not part of ERP purchases made by the carbon fund. VCS methodology VM0015 has adopted this approach for cases where the leakage belts of two contiguous project activities overlap. The VCS JNR requirements also allow for this type of agreement at the project level, where such agreements avoid gaps and overlaps, and to account for leakage within the agreed boundaries¹¹. The ACR's Nested REDD+ Standard¹² proposes a similar approach to reconcile overlapping leakage zones of nested projects, but in this case it is the jurisdiction, not the project participants, who must have in place a mechanism for reconciling the overlap and attributing leakage to the separate projects.

Pros and Cons of Different Approaches

Table 1 summarizes the advantages and disadvantages of each of the approaches described above, taking into account their environmental integrity, the barriers and advantages of their application and their potential to address leakage occurring at different geographic scales (i.e., close to REDD+ activities vs. across boundaries of the ERP). Note that in practice an ERP could use a combination of these options.

Considering decision 1/CP.16, which suggests that leakage from REDD+ activities should be monitored at the national level, and that consistency with UNFCCC principles is one of FCPF's key principles for the methodological framework, leakage accounting approaches that include monitoring should be required. However the cost and capacity requirements of monitoring leakage must also be considered.

Additionally, following the precedent of the CDM and the VCS, the FCPF could establish that only significant sources of leakage emissions arising from the implementation of ERPs would need to be accounted for. In order to assess the significance of a source of leakage, existing methods such as the

¹¹ VCS JNR Requirements (Version 3.0), section 3.12.12.

¹² Version 1.0.

CDM's "Tool for testing significance of GHG emissions in A/R CDM project activities"¹³ could be applied or adapted as necessary.

Likewise, before ERPs are implemented, an assessment of the leakage potential could be carried out, and if considered too high according to FCPF and/or country government criteria, the ERP would not be allowed to participate in the results-based mechanism unless the identified design problems were adequately addressed, reducing potential leakage to acceptable levels, or unless additional accounting mechanisms are implemented to account for leakage. The draft of the Methodology for Native Forest Protection Projects (v2.0) proposed under the CFI follows this rationale but takes it one step further by suggesting that any activity-shifting leakage would automatically render a project ineligible for crediting.

¹³ <http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf>

Table 1. Advantages and disadvantages of the identified approaches

Approach	Advantages (+) and disadvantages (-)		
	Environmental integrity	Implementation barriers/advantages	Applicability to geographic scales
Leakage belts	<ul style="list-style-type: none"> + Accounting can be accurate and truly performance-based + Minimizes the risk of environmental externality as leakage is monitored + In line with Cancun Agreement on REDD+¹⁴ 	<ul style="list-style-type: none"> + Could promote consistency among different sub-national jurisdictions and national laws + Potential for using existing leakage assessment approaches – High transaction cost associated with measurement 	<ul style="list-style-type: none"> – Often only appropriate for local drivers of deforestation and forest degradation that cause activity shifting leakage
Tracking planned deforestation agents' activities	<ul style="list-style-type: none"> + Minimizes the risk of environmental externality as leakage is monitored + In line with Cancun Agreement on REDD+ 	<ul style="list-style-type: none"> + Data may be readily available from government records, thus monitoring might be inexpensive – Identifying all the operations of deforestation agents and their affiliates may be challenging – Increased deforestation by agents with respect to their historical rate due to reasons other than the implementation of ERPs activities may be accounted as leakage 	<ul style="list-style-type: none"> + Appropriate for leakage occurring across large distances – Often less accurate for leakage from local drivers of deforestation compared to monitoring within leakage belts
Leakage deductions	<ul style="list-style-type: none"> + If applied to sub-national ERPs within a monitored national ERP, it would not impact environmental integrity and would be in line with UNFCCC rules + If the deduction is relatively high, there are incentives to design activities that minimize leakage + Viable approach for accounting for market leakage – Leakage is not typically monitored when using a leakage deduction, and is thus not in line with current UNFCCC provisions¹⁵ 	<ul style="list-style-type: none"> + Decreases the cost of leakage estimation + Potential to incentivize specific policy and programmatic interventions for reducing leakage (e.g. offering lower discount to ERPs that maintain commodity production through intensification and/or degraded land use) + Relatively easy to implement for governments aiming to attribute leakage to sub-national ERPs – If the proportion of the deduction is relatively low, there are no incentives to design activities that minimize leakage 	<ul style="list-style-type: none"> + Does not necessarily require continuous monitoring, and is therefore appropriate for leakage occurring across the boundaries of the ERP monitoring system, such as international leakage – Calibration of the deduction may be difficult if an ex-ante factor is used

¹⁴ In particular, with the provisions established in decision 1/CP.16 paragraph 71 (c), footnote 7.

¹⁵ Typically, leakage deductions are quantified using a fixed factor that is calibrated ex-ante. Unless the factor is adjusted continuously using monitored data – which is typically not the case for deductions - leakage is not actually monitored.

Approach	Advantages (+) and disadvantages (-)		
	Environmental integrity	Implementation barriers/advantages	Applicability to geographic scales
Leakage sharing agreements	± These agreements do not affect the environmental integrity of ERPs – as this would depend on the approaches adopted by each participating ERP to monitor and measure leakage	<ul style="list-style-type: none"> + May reduce the overall and individual costs of ERPs implementation + Could promote consistency among different ERPs within one country – All ERPs entering into the sharing agreements must have conducted deforestation and degradation analysis that is not only of sufficient quality but that is also compatible among the ERPs in terms of scope, procedures used, and temporal boundaries/frequency. This may limit the flexibility that ERPs have in setting RELs and designing an MRV system. – The leakage sharing agreements may raise sensitive political issues among the different sub-national jurisdictions and different countries 	<ul style="list-style-type: none"> – Applicable to leakage caused by drivers at any geographic scale
Do not require accounting for international leakage	– May overestimate net emissions for certain REDD+ policies and measures susceptible to international market leakage.	<ul style="list-style-type: none"> + The most feasible solution, given challenges in attributing and accounting for leakage from REDD+ policies and measures in one country to potential increases in deforestation/degradation in another. + Consistent with international practice (incl. UNFCCC). 	

Table 2. Scope of leakage accounting approaches

Approach	Monitoring	Quantification	Attribution
Leakage belts	Yes	Yes	Yes
Tracking planned deforestation agents	Yes	Yes	Yes
Leakage deductions	No	Yes	Yes
Leakage sharing agreements	No	No	Yes

6. Potential Candidate Approaches for the Carbon Fund Guidance, and Rationale

As can be observed in Table 2, the identified leakage accounting approaches differ in their scope and are not necessarily mutually exclusive. While leakage belts and planned deforestation tracking may be applied to identify, monitor, quantify and attribute leakage emissions (i.e., the leakage belts and the planned deforestation tracking), leakage deductions and taxes estimate leakage based on indirect assessments but do not actually monitor it. Leakage sharing agreements focus only on attributing leakage but require additional methods to monitor and quantify it. There is also the possibility of not accounting for insignificant leakage emissions. The cost of implementation is usually closely linked to the intended accuracy level. Based on the analysis, the following elements are recommended to the FCPF to manage leakage:

- The emphasis of FCPF requirements should be on **good program design that first minimizes emissions from leakage**. This could be implemented in practice by incentivizing a combination of direct leakage prevention activities targeting energy and land-use efficiency as well as agricultural production and indirect activities creating local employment and livelihoods, particularly in places where local drivers are heavily present. Specifically, market leakage should be accounted for in a holistic way that captures the impact on leakage from different drivers and markets for forest and agricultural related commodities.
- Leakage risk can be minimized by **ERPs adopting the largest accounting scale possible** for their programs, even if the areas associated with ERR generating activities only cover a subset of this broader accounting region.
- ERPs should **account for all significant in-country leakage** and seek to mitigate international leakage to the extent possible. However, **international leakage should not have to be accounted for** or deducted from the ERRs credited to the ERP.
- ERPs shall **not be credited for any “positive leakage”** which may occur (i.e. where GHG emissions decrease or removals increase outside the ERP accounting area as a result of ERP policies or measures).
- It must be required to not only monitor any loss of forest resources within an ERP, but also to investigate the **potential of a loss to be attributed as leakage** due to an individual ERR activity. It is recommended that the FCPF requires ERPs to analyze the potential and location for leakage

before ERR activities are implemented and to focus monitoring for leakage in areas where leakage is anticipated. Because of the enormous complexity of drivers of deforestation and forest degradation, there is not one single approach to account for leakage. Therefore, flexibility is required so that local circumstances are considered in the leakage monitoring system. Specifically, the appropriateness of options to account for leakage is dependent on the type of deforestation and forest degradation driver causing the leakage. In most circumstances, **a blend of the options outlined above should be optimized to account for the expected leakage** from a specific ERP. This will lead to the most appropriate and cost-effective way to account for leakage while providing the flexibility to participating countries/jurisdictions with different capacity levels and circumstances.

- Cases may arise when **unforeseen increases in deforestation or forest degradation** occur within an ERP's leakage belt that are **clearly unrelated to REDD+ activities** yet will impact the emissions reductions. We recommend that the FCPF allows excluding this loss of forest biomass from the accounting under clear and unambiguous rules.
- In some ERPs, leakage caused by forest degradation risks going unnoticed for a monitoring system that focuses on deforestation. At the very least, this risk should be assessed with ERPs being required to mitigate identified risks. Ideally, a monitoring system is put in place where more **detailed monitoring can occur in areas where the risk for leakage caused by degradation is assessed as high**.
- Finally, the FCPF should allow **disregarding leakage that is deemed insignificant** using a tool such as the CDM tool for significance. In addition, the FCPF should establish a leakage assessment risk evaluation to reject leakage-prone ERPs.

ANNEX 1: Approaches of Major Other Climate Initiatives on This Topic

Intergovernmental Panel on Climate Change (IPCC)

A number of reports elaborated by the Intergovernmental Panel on Climate Change (IPCC) touch upon the issue of leakage:

- The IPCC Good Practice Guidance on Land Use, Land Use Change and Forestry (GPG-LULUCF), in its Chapter 4, provides good practice guidance for defining project boundaries, measuring, monitoring, and estimating changes in carbon stocks and non-CO₂ GHGs, implementing plans to measure and monitor, and developing quality assurance and quality control plans. The material is intended for use with Joint Implementation (JI) and the CDM of the Kyoto Protocol. However, the GPG-LULUCF does not address leakage in the context of the CDM or JI, since at the time this issue was being negotiated as part of the modalities and procedures for the inclusion of afforestation and reforestation project activities in the CDM under the Subsidiary Body for Scientific and Technological Advice of the UNFCCC. It notes that for the CDM, leakage is an additional element in the monitoring plan, while for JI; leakage outside the project boundary is less of an issue because it should be accounted for in national GHG inventories.

- The IPCC's Third Assessment Report¹⁶ notes that leakage from industrial forests, resulting from forests established for carbon purposes, may be about 40 percent globally, assuming that all carbon forests are made available to the timber market. This compares with estimated leakages in the energy sector of about 5–20 percent. No estimates of leakage generated from protection activities are reported, but it is suggested that it may vary by country and site, unlike planted forests that are linked through the global timber market.
- The Fourth Assessment Report¹⁷ points out that the leakage problem may be addressed reasonably well within nations by caps imposed on total emissions, but that leakage of emissions across national boundaries may still occur in the absence of global coverage. Likewise, it recognizes that the order of magnitude and even the direction of leakage (negative versus positive) depend on the project design, and that leakage risk is likely to be low if a whole country or sector is involved in the mitigation activity, or if project activities are for subsistence and do not affect timber or other product markets. The report underlines that there are well-documented methods to minimize leakage of project-based activities. For example, where a project reduces deforestation, it can also reduce pressure on forest lands by intensifying the availability of fuel wood from other sources for local communities. Similarly, projects can be designed to engage local people formerly responsible for deforestation in alternative income-generating activities.

CDM Modalities

REDD+ activities have been excluded from the CDM for (at least) the first commitment period of the Kyoto Protocol, thus there exist no specific approaches to deal with leakage resulting from such activities. Nevertheless it may be useful to consider the approaches established to address leakage from A/R CDM activities:

- Decision 5/CMP.1, which defines the modalities and procedures for A/R CDM in the first commitment period of the Kyoto Protocol, establishes that afforestation or reforestation project activities under the CDM shall be designed in such a manner as to minimize leakage. Moreover, it mandates project participants to include as part of the project design document, a monitoring plan that provides for, inter alia, the identification of all potential sources of, and the collection and archiving of data on, leakage during the crediting period, as well as procedures for the periodic calculation of the net anthropogenic GHG removals by sinks due to the afforestation or reforestation project activity and documentation of all steps involved in those calculations, and for the periodic review of activity implementation and measures to minimize leakage. A project activity shall be described in detail in a project design document, and this description shall include measures to be implemented to minimize potential leakage.
- At the project methodology level, some tools aimed at estimating specific sources of leakage have been developed, i.e., the A/R methodological tool "Calculation of GHG emissions due to

¹⁶ TAR Working Group III: Mitigation, Chapter 4, section 4.6.2 "Carbon Offsets, Tradable Permits, and Leakage".

¹⁷ Fourth Assessment Report, Working Group III: Mitigation, chapter 9 "Forestry", section 9.6.6 "Lessons learned from project-based afforestation and reforestation since 2000", subsection 9.6.6.1 "Leakage".

leakage from increased use of non-renewable woody biomass attributable to an A/R CDM project activity” and the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”. Additionally, the “Tool for testing significance of GHG emissions in A/R CDM project activities” has been developed to facilitate the determination of which GHG emissions by sources, possible decreases in carbon pools, and leakage emissions are insignificant for a particular A/R CDM project activity and may thus be ignored.

- Not accounting for insignificant sources of leakage is allowed in the context of the CDM/AR. The relevance of a particular source is assessed through the application of the “Tool for testing significance of GHG emissions in A/R CDM project activities”.

Joint Implementation (JI) Modalities

Decision 10/CMP.1 defines the criteria for baseline setting and monitoring of JI project activities. These include, inter alia, provisions that project participants shall include, as part of the project design document, a monitoring plan for periodic calculation of anthropogenic emissions reductions by sources and/or enhancements of anthropogenic removals by sinks by the proposed Article 6 project, and for leakage effects, if any. Moreover, it states that methodologies for baselines and monitoring, including methodologies for small-scale project activities, approved by the Executive Board of the CDM, may be applied by project participants under JI, as appropriate.

Australian Carbon Farming Initiative (CFI)

The CFI is designed to allow farmers and land managers to earn sellable emissions reductions and storage from agriculture, forestry, and other land use. To date, only draft methodologies have been produced for forestry, with none approved for final use. A Methodology for Native Forest Protection Projects (v2.0) has been drafted but remains incomplete.¹⁸ However, it does identify leakage, and outlines general practices to account for it.

Leakage from activity-shifting is identified, but must only be checked for when project proponents control parcels outside the project area (i.e., those who may shift harvesting outside of project boundaries). If evidence from controlled lands outside the project area, e.g., land-use designations or forest management plans, indicates no material changes related to the project, leakage is considered non-existent. According to the proposed methodology, any activity-shifting leakage automatically renders a project ineligible for crediting. However, only project proponents are mentioned explicitly: no other baseline land users are considered as sources of leakage outside project boundaries. Activity-shifting of illegal logging or other illegal extraction of forest products is not considered relevant as the methodology states: “Illegal logging is not considered a threat in Australia due to widespread recognition of private property, and strong enforcement of commercial forest harvesting regulation.”

¹⁸ DCCEE, 2012. Carbon Farming Initiative: Draft Methodology for Native Forest Protection Projects. Australia Government Department of Climate Change and Energy Efficiency. Available at: <http://www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/methodology-development/methodologies-under-consideration/~media/government/submissions/cfi/CFI-The-Carbon-Store-20120607-PDF.pdf>

Market leakage is identified in the CFI, but procedures for its accounting have not yet been defined, with the methodology stating it to be determined by the Department of Climate Change and Energy Efficiency.

It should be noted that the Draft Methodology for Reforestation and Afforestation (v2.0) contains no reference to leakage whatsoever.¹⁹ However, both documents are drafts only, and may change significantly prior to implementation.

New Zealand

Within New Zealand, two carbon forestry programs exist: the Permanent Forest Sink Initiative (PFSI) and the New Zealand Emissions Trading Scheme (NZ ETS). The PFSI, a voluntary scheme, entails only afforestation projects, and involves no requirements to either account for or monitor project-related leakage.²⁰

The NZ ETS comprises both voluntary and compliance components based on the age of forest stands, with neither requiring leakage accounting by project proponents. Non-native forests that are established before 1990 are subject to NZ ETS emissions restrictions, and are therefore under a cap. Owners must surrender emissions units (NZUs) if these pre-1990 forests are felled and not replanted within 4 years. Note that native forests were already protected under the Forestry Act 1949.²¹ Since pre-1990 forests fall under a cap, no avoided conversion projects can be established in these forests, and leakage in this type of forest is irrelevant.

Forests that are established after 1989 can be voluntarily included in the NZ ETS, with NZUs issued for sequestration, which can be sold as offsets to other emitters. However, once part of the ETS, post-1989 forests must surrender emission reductions from harvest as well. Leakage could potentially occur if the voluntary participation of post-1989 forest stands reduces harvest rates and conversion and increases pressure on non-participating post-1989 forest stands. However, any felled non-participating stands would not have been counted in New Zealand's carbon stocks, and are therefore explicitly outside the accounting boundary.²²

There is a possibility of international leakage from NZ ETS-induced forest conservation, which is being monitored by the nation's government, but no action has yet been taken.²³ Even though comprehensive forestry regulations and enforcement make leakage within New Zealand unlikely, article 3.3 of the Kyoto Protocol²⁴ requires forest carbon reporting in a transparent and verifiable way, rendering leakage an

¹⁹ DCCEE, 2012. Carbon Farming Initiative: Draft Methodology Reforestation & afforestation [Internet]. Government of Australia; 2012. Available from: www.climatechange.gov.au/en/government/initiatives/carbon-farming-initiative/methodology-development/methodologies-under-consideration/~media/government/submissions/cfi/cfi-co2australiarfmethdproposal-20120216-docx.docx

²⁰ NZ Ministry for the Environment, 2007. Permanent Forest Sink Initiative Bulletin: Issue 5 [WWW Document]. Ministry for the Environment. URL <http://maxa.maf.govt.nz/forestry/pfsi/bulletin/issue-5/>

²¹ NZ MPI, 2012. Indigenous Forestry [WWW Document]. Ministry for Primary Industries. URL <http://www.mpi.govt.nz/forestry/forestry-indigenous-forestry.aspx> (accessed 11.21.12).

²² NZ Auditor General, 2012. Part 5: ETS Sectors - Office of the Auditor General New Zealand [WWW Document]. Office of the Auditor General New Zealand. URL <http://www.oag.govt.nz/2011/emissions-trading-scheme/part5.htm> (accessed 11.20.12).

²³ NZ Ministry for the Environment, 2012. Summary of proposed changes to the NZ ETS - Emissions Trading Bulletin 11 [WWW Document]. Ministry for the Environment. URL <http://www.mfe.govt.nz/publications/climate/emissions-trading-bulletin-11/index.html> (accessed 11.20.12).

²⁴ UNFCCC, 1992. Kyoto Protocol to the United Nations Framework Convention on Climate Change. Available from: <http://unfccc.int/resource/docs/convkp/kpeng.pdf>

important part of national forest carbon accounting. It is possible that leakage may be deducted from timber-based government carbon yield calculations, although this is not apparent. Regardless, none of New Zealand's carbon forestry actions credit avoided deforestation (by its typical definition), and any leakage strategies adopted may not be readily applicable to a REDD+ framework, nor in countries with weaker forestry regulation and monitoring.

California's REDD Offset Working Group (ROW)

California's ROW will provide recommendations to California's Air Resource Board, which is tasked with implementing California's cap-and-trade system under Assembly Bill 32. The ROW has not released any recommendations or procedures for addressing leakage to date.

Climate Action Reserve (CAR)

For the Reserve, leakage falls under the category of Secondary Effects, as described in the Forest Project Protocol v3.3.²⁵ Based on data from California's Fire and Resource Assessment Program, a discount factor of 3.6 percent was calculated. This discount factor is to be applied to emissions reductions from avoided conversion projects. The discount factor was later adopted for project across the United States. The value of secondary effects is subtracted from emissions reductions on an annual basis. There are no contingencies for leakage prevention. Although the method applied may lack the granularity of more comprehensive approaches, it is straightforward, verifiable and highly standardized. In many cases, the local context may not warrant a more complicated method. Calibration of a similar leakage factor in other jurisdictions would require a substantial analysis of land use change data and a thorough understanding of local leakage risks.

For REDD+ projects in Mexico, the Reserve has produced the Draft Mexico Forest Protocol v1.0, which outlines procedures to address leakage.²⁶ Data from the local forest management unit reports are used to determine area and driver-specific leakage risk factors for agriculture, harvested wood products, grazing, and development. Mitigation measures such as agricultural intensification to increase yield and reduce pressure to convert forest can be instituted to help reduce leakage. The impact of leakage mitigation measures on reducing leakage is quantified by means of a set of discount factors that are specific for each practice. The discount factors are applied to the leakage extent. No note is made of market effects in the most recent draft version.

Verified Carbon Standard (VCS)

The VCS allows for project developers and other parties to produce methodologies, which can then be instituted following approval by the VCS. This allows for differing approaches to leakage, with varied methods of calculation and management depending on project type and leakage source.

²⁵ CAR, 2012. Forest Project Protocol v3.3 [Internet]. Climate Action Reserve; 2012. Available from: www.climateactionreserve.org/how/protocols/forest/dev/version-3-3/

²⁶ Draft Mexico Forest Protocol [Internet]. Climate Action Reserve; 2012 [cited 2012 Nov 21]. Available from: http://www.climateactionreserve.org/wp-content/uploads/2011/11/Mexico_Forest_Protocol_V1.0_PUBLIC_DRAFT.pdf

General Verified Carbon Standard (VCS) Agriculture, Forestry and other Land Use (AFOLU) Requirements

The VCS Agriculture, Forestry and other Land Use (AFOLU) Requirements v3.3²⁷ outlines the general approach to account for leakage in this category of methodology. Leakage must be identified, and the use of leakage management zones to minimize displacement of emissions is recommended (by maintaining agriculture or forestry production). The use of other leakage mitigation measures is also encouraged. Leakage evaluations must be documented, and market leakage calculations must occur at verification and validation.

According to the above document, avoidance of planned deforestation (when the agent of deforestation has ownership of, management of or the right to deforest) entails two leakage types. When the deforestation agent is known, management plans and land use designations must not have materially changed because of the project. When only the *class* of deforestation agent is known, leakage is quantified using the difference between historical and with-project deforestation rates attributed to the class of agent.

The *AFOLU Requirements* also describes the general leakage requirements for the avoidance of unplanned deforestation and degradation. This entails the identification of social-economic drivers of deforestation, and the monitoring of the area around the project and other reference areas to determine leakage.

Where relevant, market leakage must also be accounted for at the country scale, factoring in market elasticity, and based on data from peer-reviewed journals. Dependent on the productivity of the project area for merchantable forest products compared to that of other harvestable areas, discount factors between 20 and 70 percent are to be applied.

Verified Carbon Standard (VCS) Avoided Deforestation Methodologies

The following methodologies pertain to avoided deforestation or degradation within the VCS:

- REDD Methodology Modules v1.3 (VM0007)²⁸
- Methodology for Avoided Deforestation v2.0 (VM0009)²⁹
- Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp Forests v1.0 (VM0004)³⁰
- Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation v1.0 (VM0006)³¹

²⁷ VCS, 2012. Agriculture, Forestry and Other Land Use (AFOLU) Requirements v3.3 [Internet]. Verified Carbon Standard; Available from: http://v-c-s.org/sites/v-c-s.org/files/AFOLU%20Requirements%20v3.3_0.pdf

²⁸ Avoided Deforestation Partners, 2012. REDD Methodology Modules [Internet]. Verified Carbon Standard; 2012. Available from: <http://v-c-s.org/sites/v-c-s.org/files/VM0007%20REDD-MF,%20v1.3.pdf>

²⁹ Wildlife Works. Methodology for Avoided Deforestation [Internet]. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VM0009%20Methodology%20for%20Avoided%20Deforestation%20v2.0%2026%20OCT%202012.pdf>

³⁰ Infinite Earth, 2010. Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VM0004%20Methodology%20for%20Conservation%20Projects%20that%20Avoid%20Planned%20Land%20Use%20Conversion%20in%20Peat%20Swamp%20Forests%2C%20v1-0.pdf>

³¹ Terra Global Capital, 2010. Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VM0006%20Methodology%20for%20Carbon%20Accounting%20in%20Project%20Activities%20that%20Reduce%20Emissions%20from%20Mosaic%20Deforestation%20and%20Degradation%20v1.0.pdf>

- Methodology for Avoided Unplanned Deforestation v1.0 (VM0015)³²

The REDD Methodology Modules makes use of four leakage modules to account for leakage: Estimation of emissions from activity shifting for avoided unplanned deforestation (LK-ASU), v1.0³³, The Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP), v1.1³⁴, Estimation of emissions from displacement of fuelwood extraction (LK-DFW), v1.0³⁵, and Estimation of emissions from market-effects (LK-ME), v1.0³⁶.

In addition, there are two stand-alone Methodology Modules (which can be applied to a variety of methodologies) focused exclusively on leakage accounting:

- Estimation of Emissions from Activity-Shifting Leakage, v1.0 (VMD0032)
- Estimation of Emissions from Market Leakage, v1.0 (VMD0033)

All methodologies involving the avoidance of unplanned deforestation monitor a leakage belt, or leakage area outside the project boundary where activity-shifting is likely to occur in order to quantify and attribute leakage.

While the aforementioned VCS methodologies generally adhere to the leakage approaches described in the AFOLU requirements, methodology-specific details are shown in Leakage Accounting Tables

[s.org/files/VM0006%20Methodology%20for%20Carbon%20Accounting%20in%20Project%20Activities%20for%20Mosaic%20REDD%20Version%201.0_0.pdf](http://v-c-s.org/files/VM0006%20Methodology%20for%20Carbon%20Accounting%20in%20Project%20Activities%20for%20Mosaic%20REDD%20Version%201.0_0.pdf)

³² Pedroni, Lucio, 2012. Methodology for Avoided Unplanned Deforestation (v1.0). Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VM0015%20Methodology%20for%20Avoided%20Unplanned%20Deforestation.pdf>

³³ Avoided Deforestation Partners, 2012. Estimation of emissions from activity shifting for avoided unplanned deforestation [Internet]. Verified Carbon Standard; 2012 Available from: <http://v-c-s.org/sites/v-c-s.org/files/VMD0010%20LK-ASU%20Unplanned%20leakage.pdf>

³⁴ Avoided Deforestation Partners, 2012. Estimation of emissions from activity shifting for avoided planned deforestation and planned degradation [Internet]. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VMD0009%20LK-ASP%20v1.1.pdf>

³⁵ Avoided Deforestation Partners, 2012. Estimation of emissions from displacement of fuelwood extraction [Internet]. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VMD0012%20LK-DFW%20Fuelwood%20leakage.pdf>

³⁶ Avoided Deforestation Partners, 2012. Estimation of emissions from market effects [Internet]. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/VMD0011%20LK-ME%20Leakage%20market%20effects.pdf>

Leakage Accounting Tables

Jurisdictional and Nested REDD+ Requirements

The VCS has also released its JNR Requirements v3, which outlines the responsibilities of jurisdictions and proponents regarding leakage.³⁷ These are briefly summarized below:

- International leakage is not accounted for
- Positive leakage outside program or project area is not credited
- Jurisdictional proponents are responsible for identification of drivers of deforestation and degradation, and the prevention of leakage
- Sub-national jurisdictions are responsible for all emissions or reductions within their territory, and not for leakage outside of it (unless the sub-national jurisdiction where leakage occurs has no GHG program in place: then normal leakage accounting procedures apply)
- When a national program is in place, sub-national jurisdictions are to use the national framework to account for leakage outside their boundaries

The VCS has established a working group for developing a jurisdictional leakage tool, which is expected to be released later this year.

American Carbon Registry

Forestry methodologies under the ACR adhere to the Forest Carbon Project Standard v2.1³⁸, which outlines general requirements for leakage accounting and management. In REDD projects this entails the identification and quantification of activity-shifting leakage, as well as the definition of the potential scope of leakage and/or establishment of a leakage zone to monitor for activity-shifting. For projects involving planned deforestation, deforestation agents must be monitored, or default deduction factors proposed and approved, where applicable.

Market effects are to be addressed either through the provision of alternative areas for production of markets goods (i.e., leakage prevention), or through a calculated leakage deduction factor. Currently, only market-affected leakage of timber production is included, but all other potential market effects require discussion in project documents.

Two ACR methodologies deal specifically with avoided deforestation: the ACR REDD Methodology Modules v1.0³⁹, and the Methodology for REDD- Avoiding Planned Deforestation v1.0⁴⁰. The former was

³⁷ VCS, 2012. Jurisdictional and Nested REDD+ (JNR) Requirements [Internet]. Verified Carbon Standard; Available from: <http://v-c-s.org/sites/v-c-s.org/files/Jurisdictional%20and%20Nested%20REDD%2B%20Requirements%2C%20v3.0.pdf>

³⁸ ACR, 2010. Forest Carbon Standard v2.1. American Carbon Registry. <http://americancarbonregistry.org/carbon-accounting/forest-carbon-project-standard-v2.0/ACR%20Forest%20Carbon%20Project%20Standard%20v2.1.pdf>

³⁹ Pearson, T, Brown, S, Walker, S, 2012. American Carbon Registry REDD Methodology Modules. American Carbon Registry. Available from: <http://americancarbonregistry.org/carbon-accounting/redd-mf>

⁴⁰ ACR, 2011. American Carbon Registry® Methodology for REDD—Avoiding Planned Deforestation [Internet]. Verified Carbon Standard; Available from: <http://americancarbonregistry.org/carbon-accounting/redd-2013-avoiding-planned-deforestation/ACR%20Methodology%20for%20REDD%20-%20Avoiding%20Planned%20Deforestation%20v1.0%20April%202011.pdf>

developed by the same authors, and is virtually identical to the VCS REDD Methodology Modules, including the methods by which leakage is addressed. Activity-shifting in avoided unplanned deforestation and degradation is accounted for using a leakage belt, factoring in proportions of local and immigrant deforestation and degradation⁴¹. Activity shifting in avoided planned deforestation is accounted for through monitoring of known deforestation agents and forest productivity factors for unknown agents⁴². Displacement of fuelwood extraction is monitored via surveys in the leakage area⁴³, and emissions from market effects are estimated using discount factors based on relative land productivity in the host country⁴⁴. There are, however, some minor differences between the ACR and VCS methodologies that allow for more flexibility when using the former (e.g., allowance for a smaller leakage belt in certain circumstances), but the strategies and guiding principles are effectively the same.⁴⁵

The only other complete avoided deforestation methodology by the ACR, the Methodology for REDD-Avoiding Planned Deforestation, uses the same process to calculate activity leakage as the ACR module “Estimation of emissions from activity shifting for avoided planned deforestation and planned degradation” (see [Error! Bookmark not defined.](#)), and the eponymous VCS module (see [Error! Bookmark not defined.](#)), and entails survey data for leakage quantification. Market leakage is estimated only for harvested timber, and is calculated in the same fashion as the ACR and VCS Estimation of emissions from market effects (see [Error! Bookmark not defined.](#), [Error! Bookmark not defined.](#)), except that commercial fuelwood harvest is excluded. Monitoring of leakage must occur at least every 5 years.

Unlike the VCS, the ACR has not yet established jurisdictional REDD+ requirements, although it has developed a Nested REDD+ Standard (v1.0), which contains elements that could later be included in a jurisdictional standard.⁴⁶ Although some of these are similar to the VCS jurisdictional requirements (negation of international leakage, jurisdictional monitoring of leakage), a new concept is the establishment of a specific leakage buffer to correct for the lag between jurisdictional leakage assessments and project crediting – an idea that could potentially be applied between national and sub-national jurisdictions. This mechanism was not further explored within the body of this paper because as it is mostly related to nesting and the different timing of crediting between projects and jurisdictions.

⁴¹ Pearson, T, Brown, S, Walker, S, 2012. Estimation of emissions from activity shifting for avoided unplanned deforestation [Internet]. American Carbon Registry. Available from: <http://americancarbonregistry.org/carbon-accounting/lk-asu>

⁴² Pearson, T, Brown, S, Walker, S, 2012. Estimation of emissions from activity shifting for avoided planned deforestation and planned degradation [Internet]. American Carbon Registry; Available from: <http://americancarbonregistry.org/carbon-accounting/lk-asu>

⁴³ Pearson, T, Brown, S, Walker, S, 2012. Estimation of emissions from displacement of fuelwood extraction [Internet]. American Carbon Registry; Available from: <http://americancarbonregistry.org/carbon-accounting/lk-dfw>

⁴⁴ Pearson, T, Brown, S, Walker, S, 2012. Estimation of emissions from market effects [Internet]. American Carbon Registry; Available from: <http://americancarbonregistry.org/carbon-accounting/lk-me>

⁴⁵ ACR, 2012. Summary of Differences between ACR and Verified Carbon Standard (VCS REDD Methodology modules [Internet]. American Carbon Registry. Available from: <http://americancarbonregistry.org/carbon-accounting/differences-between-acr-and-vcs-modules>

⁴⁶ ACR, 2012. American Carbon Registry® Nested REDD+ Standard [Internet]. American Carbon Registry; Available from: <http://americancarbonregistry.org/carbon-accounting/acr-nested-redd-standard-v1.0>

Leakage Accounting Tables

Table 3: Leakage accounting in major forest carbon standards

	Activity Shifting					Market Effects		
	Applicability	Leakage belt	Agent tracking	Factor	Undefined	Agent Tracking	Factor	Undefined
IPCC					●			●
CDM Modalities			●					●
Jl Modalities*			●					●
Australian Carbon Farming Initiative								
Native Forest Protection (draft)	●							●
New Zealand								
Permanent Forest Sink Initiative					●			●
Emissions Trading Scheme					●			●
Climate Action Reserve								
Forest Project Protocol v3.3: Avoided Conversion				●				●
Mexico Forest Protocol v1.0 (draft)		●	●					●
American Carbon Registry								
Forest Carbon Standard v2.1		●	●				●	
REDD Methodology Modules v1.3								
• Estimation of emissions from activity shifting for avoided unplanned deforestation, (LK-ASU), v1.0		●	●					●
• Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP), v1.1			●					●
• Estimation of emissions from displacement of fuelwood extraction (LK-DFW), v1.0		●						●
• Estimation of emissions from market-effects (LK-ME), v1.0					●		●	
REDD- Avoiding Planned Deforestation v1.0		●	●				●	

* CDM methodologies eligible for use with JI projects. Note: “Applicability” refers to the addressing of leakage through applicability criteria, meaning that leakage is prohibited or must be insignificant. “Leakage belt” refers to the addressing of leakage through monitoring and field data collection, e.g., field sampling, and/or the use of remote sensing imagery, etc. throughout a prescribed area near the project boundary. “Agent tracking” refers to the monitoring of deforestation agents in or outside of the project boundary. “Factor” refers to the addressing of leakage through the application of generalized leakage factors based on a decision-tree or similar categorization approach. “Undefined” refers to the omission of details regarding approach to leakage.

Table 4: Leakage accounting in VCS avoided deforestation methodologies

	Activity Shifting					Market Effects		
	Applicability	Leakage belt	Agent tracking	Factor	Undefined	Survey	Factor	Undefined
Verified Carbon Standard								
AFOLU Requirements v3.3: Reduced Emissions from Deforestation and Degradation		•	•				•	
REDD Methodology Modules v1.3 (VM0007)								
• Estimation of emissions from activity shifting for avoided unplanned deforestation, (LK-ASU), v1.0		•	•					•
• Estimation of emissions from activity shifting for avoided planned deforestation (LK-ASP), v1.1			•					•
• Estimation of emissions from displacement of fuelwood extraction (LK-DFW), v1.0		•						•
• Estimation of emissions from market-effects (LK-ME), v1.0					•		•	
Methodology for Avoided Deforestation v2.0 (VM0009)		•	•				•	
Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp Forests v1.0 (VM0004)		•	•				•	
Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation v1.0 (VM0006)		•	•				•	
Methodology for Avoided Unplanned Deforestation v1.0 (VM0015)		•	•					•
Estimation of Emissions from Activity-Shifting Leakage, v1.0 (VMD0032)		•	•					•
Estimation of Emissions from Market Leakage, v1.0 (VMD0033)							•	

